

Claims

1. (Previously Presented) A device for heating-ventilation and/or air-conditioning a passenger compartment of a motor vehicle, including means for producing an air flow at an adjusted temperature, as well as air outlets for defrosting, aeration and foot-warming which are supplied by this adjusted air flow and are suitable for being connected to ducts leading into the passenger compartment,

characterised in that it comprises at least one ventilation module (14), at least one heating module (12), and at least one distribution module (16) grouped substantially at the same horizontal level;

said at least one ventilation module (14) arranged to produce the air flow;

said at least one heating module (12) comprising a housing (30) connected to said ventilation module, an air inlet (28) in said housing (30) for the air flow, heat exchangers (32, 34, 36) disposed in said housing (30) through which the air flow can pass, and at least one side air outlet (46d, 46g) in said housing; and

said at least one distribution module (16) having a casing (52) with air outlets (54, 56, 58) and with an inlet (50) connected to at least one of said side air outlets (46d, 46g) of the heating module, said distribution module comprising distribution means disposed within said casing (52) for distributing the air flow between the air outlets (54, 56, 58), said distribution means configured to selectively open and close the air outlets (54, 56, 58) for leading the air flow to selected areas of the passenger compartment.

2. (Previously Presented) A device according to claim 1, characterised in that the heating module (12) comprises two side air outlets (46d, 46g) opening from sides, respectively, of said heating module (12) and in that the device includes two distribution modules (16) arranged to be placed on the sides, respectively, of the heating module, each having an inlet

(50) with said two inlets (50) connected to said two side air outlets (46d, 46g), respectively, of the heating module.

3. (Previously Presented) A device according to one of claims 1 and 2, characterised in that the heating module (12) extends along a longitudinal axis and the ventilation module (14) is placed next to the heating module (12) in a transverse direction to the longitudinal axis.

4. (Previously Presented) A device according to one of claims 1 and 2, characterised in that the heating module (12) extends along a longitudinal axis and the ventilation module (14) is placed next to the heating module (12) along the longitudinal axis.

5. (Previously Presented) A device according to claim 1, characterised in that the ventilation module (14) includes an air inlet unit (18) for outside air and/or recirculated air, a blower (22) for producing the air flow, and an outlet channel (26) for leading the air to the inlet (28) of the heating module.

6. (Previously Presented) A device according to claim 1, characterised in that the inlet (28) of the heating module (12) is located in a lower portion thereof, and in that the heating module (12) houses, from the lower portion to a top portion of said heating module (12), an air-conditioning evaporator (32) and at least one heating radiator (34, 36).

7. (Previously Presented) A device according to claim 6, characterised in that the heating module (12) houses a first heating radiator (34) through which a heat transfer fluid passes, placed between the evaporator (32) and said top of said heating module (12), as well as

a second electric heating radiator (36) placed between the first heating radiator (34) and said top of said heating module (12).

8. (Previously Presented) A device according to one of claims 6 and 7, characterised in that the evaporator (32) and the heating radiator (34) each extend along a plane inclined at an angle between 0° and 90° with respect to the horizontal.

9. (Previously Presented) A device according to claim 8, characterised in that the evaporator (32) extends along a plane inclined at an angle between 20° and 40° with respect to the horizontal.

10. (Previously Presented) A device according to claim 1, characterised in that it includes adjusting means (44d, 44g, 48) for producing an air flow at an adjusted temperature resulting from mixing, in a variable proportion, a warm air flow that has passed through the heating radiator (34, 36) and a cold air flow that has bypassed the heating radiator (34, 36).

11. (Previously Presented) A device according to claim 10, characterised in that the adjusting means in each case include a side warm air channel (38d, 38g) passing through a portion of the heating radiator (34, 36) and a side cold air channel (40d, 40g) bypassing the side warm air channel, as well as a side mixing flap (44d, 44g) for distributing, in a variable proportion, the warm air flow in the side warm air channel and the cold air flow in the side cold air channel, with the side warm air channel (38d, 38g) and the side cold air channel (40d, 40g) jointly forming a side outlet (46d, 46g) of the heating module.

12. (Previously Presented) A device according to claim 11, characterised in that each side mixing flap (44d, 44g) is located in the heating module (12).

13. (Previously Presented) A device according to claim 11, characterised in that each side mixing flap is located in the distribution module (16), which is located on sides of the heating module (12).

14. (Previously Presented) A device according to claim 10, characterised in that the adjusting means also include a central air channel (66) for warm air that has passed through a portion of the heating radiator (34, 36) and a central air channel (70) for cold air that has bypassed the central air channel (66), as well as a central mixing flap (72) for distributing, in a variable proportion, the air flow going to the central warm air channel (66) and the air flow in the central cold air channel (70), with the two central channels (66, 70) jointly forming a central outlet (74) of the heating module (12) arranged for supplying at least one other distribution module (76) for distributing an air flow at an adjusted temperature to the rear of the passenger compartment.

15. (Previously Presented) A device according to claim 14, characterised in that the central mixing flap (72) is located in the heating module (12).

16. (Previously Presented) A device according to claim 14, characterised in that the central mixing flap (72) is located in the other distribution module (76).

17. (Previously Presented) A device according to one of claims 14 to 16, characterised in that the adjusting means also include a distribution flap (73) that can move between a first position (73a) to send the air flow at an adjusted temperature to the side outlet(s) (46d, 46g) of the heating module (12) supplying the front of the passenger compartment, and a second position (73b) for sending the air flow at an adjusted temperature

to the central outlet (74) of the heating module (12) supplying the rear of the passenger compartment.

18. (Previously Presented) A device according to claim 1, characterised in that it includes two side outlet chambers (108d, 108g) located downstream of the heating radiator (34, 36) and respectively leading to the side outlets (46d, 46g) of the heating module.

19. (Previously Presented) A device according to claim 18, characterised in that it also includes at least one side cold air channel (112d, 112g) for directly leading a cold air flow from the heating module (12), upstream of the heating radiator (34), to a distribution module (16) located on a side of said heating module (12).

20. (Previously Presented) A device according to claim 18, characterised in that it also includes a central outlet chamber located downstream of the heating radiator (34, 36) and leading to a central outlet of the heating unit (12), and arranged to supply at least one other distribution module (76) for distributing an air flow at an adjusted temperature to the rear of the passenger compartment.

21. (Previously Presented) A device according to claim 14, characterised in that it also includes at least one central cold air channel for directly leading a cold air flow from the heating module (12), upstream of the heating radiator (34), to the other distribution module (76) or to a compartment to be cooled.

22. (Previously Presented) A device according to claim 1, characterised in that the distribution module(s) (16) each have a lower outlet (56) for leading to feet of a passenger, an

upper outlet (54) for leading to a windshield and at least one intermediate outlet (58) for opening into a front area.

23. (Previously Presented) A device according to claim 1, characterised in that it includes adjusting means (104) acting on the flow, and therefore the temperature, of a coolant passing through the heating radiator (34) for producing an air flow at an adjusted temperature.

24. (Previously Presented) A device according to claim 23, characterised in that it includes two side outlet chambers (108d, 108g) located downstream of the heating radiator (34, 36) and respectively leading to the side outlets (46d, 46g) of the heating module.

25. (Previously Presented) A device according to claim 24, characterised in that it also includes at least one side cold air channel (112d, 112g) for directly leading a cold air flow from the heating module (12), upstream of the heating radiator (34), to a distribution module (16) located on a side of said heating module (12).

26. (Previously Presented) A device according to claim 24, characterised in that it also includes a central outlet chamber located downstream of the heating radiator (34, 36) and leading to a central outlet of the heating unit (12), and arranged to supply at least one other distribution module (76) for distributing an air flow at an adjusted temperature to the rear of the passenger compartment.

27. (Previously Presented) A device according to claim 24, characterised in that it also includes at least one central cold air channel for directly leading a cold air flow from the heating module (12), upstream of the heating radiator (34), to the other distribution module (76) or to a cooling compartment.

28. (Cancelled)

29. (Previously Presented) A device according to claim 1, characterised in that the modules (12, 14, 16) that constitute it are integrated in a transverse beam (128) of the vehicle.

30. (Previously Presented) A device for heating-ventilation and/or air-conditioning a passenger compartment of a motor vehicle, said device comprising:

at least one ventilation module (14), at least one heating module (12), and at least one distribution module (16) grouped substantially at the same horizontal level;

said at least one ventilation module (14) arranged to produce air flow;

said at least one heating module (12) comprising a housing (30) connected to said ventilation module, an air inlet (28) in said housing (30) for the air flow, heat exchangers (32, 34, 36) disposed in said housing (30) through which the air flow can pass, and at least one side air outlet (46d, 46g) in said housing;

said at least one distribution module (16) having a casing (52) with air outlets (54, 56, 58) and with an inlet (50) connected to at least one of said side air outlets (46d, 46g) of said heating module, said distribution module comprising distribution means disposed within said casing (52) and configured to selectively open and close the air outlets (54, 56, 58); and

said heating module (12) comprising at least one side air outlet (46d, 46g) with at least one distribution module (16) arranged to be placed on a side of said heating module, said distribution module having an inlet (50) connected to said side air outlet (46d, 46g) of said heating module;

wherein said inlet (28) of said heating module (12) is located in a lower portion thereof and wherein said heating module (12) houses, from the lower portion to a top portion of said heating module (12), an air-conditioning evaporator (32) and at least one heating radiator (34, 36).